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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,482	09/27/2001	Hee-Tae Lee	SEC.843	8845

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EXAMINER
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MASINICK, MICHAEL D

ART UNIT	PAPER NUMBER
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2125

DATE MAILED: 01/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Applicati n No.

09/963,482

Applicant(s)

LEE ET AL.

Examiner

Michael D Masinick

Art Unit

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-- The MAILING DATE of this communication appears on the cov r sheet with the correspondenc address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 8, 9, and 11 recite the limitation " back-flow preventing gas". There is insufficient antecedent basis for this limitation in the claim. Claims 8 and 9 are not further treated on the merits because examiner cannot ascertain the correct meaning of the claims and intended dependencies. Claim 11 is best treated as understood by the examiner.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,902,403 to Aitani et al in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al.
3. Aitani shows a method of performing a chemical vapor deposition process comprising: cleaning a process chamber by introducing a cleaning gas into the process chamber through a cleaning gas supply line (Claim 1, part C); loading a wafer into the process chamber after said cleaning (Col 1, lines 32-34 – "restart production promptly after cleaning"); and depositing a

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film on the wafer by introducing a deposition gas into the process chamber (Inherent to any chemical vapor deposit system).

4. Aitani does not show preventing the deposition gas from flowing back toward the cleaning gas supply line.

5. Takeda et al shows "two valves to prevent a film forming gas... and a cleaning gas... from reversly flowing into different passage from the specified one.

6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the valve system of Takeda as a flow prevention mechanism of Aitani because it "prevents piling of ammonium chloride and so on which in generated by mixing forming gas and cleaning gas".

7. Regarding claim 12, Takeda shows wherein during said depositing, a connector (valve) which connects the cleaning gas supply line to the process chamber is closed to prevent the deposition gas from flowing back toward the cleaning gas supply line.

8. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,902,403 to Aitani et al in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of Japanese Patent Abstract of Publication Number 1995-094487 to Osada et al.

9. Aitani in view of Takeda as shown above does not show where a backflow preventing gas is introduced into the process chamber through the cleaning gas supply line to prevent the deposition gas from flowing back toward the cleaning gas supply line.

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10. Osada et al shows an inactive gas is supplied from the treating gas supply means at the time of cleaning as to prevent the cleaning gas from flowing back into the treating gas supply means. One of ordinary skill in the art at the time of invention would have been able to invert these two situations and prevent the active gas from flowing back into the cleaning gas supply means at the time of active deposition.

11. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the backflow prevention means of Osada in the cleaning vapor deposition system of Aitani in view of Osada because it makes it possible to "prevent the CIF gas from coming in during the formation of the film" which would create a film on the gas lines.

12. Referring to claim 3, Osada shows where the back-flow prevention gas is an inactive gas. One of ordinary skill in the art would have made Argon the obvious and well known choice because Argon is also used to form inert atmospheres for arc welding, growing semiconductor crystals and processes that require shielding from other atmospheric gases. Helium is also one of the 6 inactive (inert) gases which would have been obvious to choose from based upon availability and cost.

13. Referring to claim 4, Osada does not specifically show where the flow rate is between 30-100% of the flow rate of the deposition gas. However these numbers provide such a wide range that it would have been obvious to one of ordinary skill in the art at the time of invention to use a number within this range for any variety of reasons. Applicant is asked to specifically point out if this range would not normally be used and a number under 30% would be the accepted normal setting.

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14. Referring to claim 5, Aitani shows wherein the cleaning gas is a gas including a fluorine radical which is generated by exciting NF.sub.3 gas at an exterior of the process chamber before said cleaning (Col 7, lines 50-53).

15. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,902,403 to Aitani et al in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of U.S. Patent No. 5,275,976 to Moslehi.

16. Aitani in view of Takeda as shown above does not show wherein the cleaning gas includes an active gas and an inert gas as a carrier gas for carrying the active gas or that the inert gas is selected from the group of nitrogen, argon, and helium.

17. Moslehi shows a purge module for cleaning semiconductor processing chambers where inert gases are used as carrier gases and that this inert gas can be argon (Col 7, lines 42-53).

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use argon as a carrier gas in the processing system of Aitani in view of Takeda because it allows the user full control over the amount of active gas in the sensitive semiconductor processing system.

19. Claims 10, 11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,902,403 to Aitani et al in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of U.S. Patent No. 5,380,370 to Niino et al.

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20. Aitani in view of Takeda as shown above does not show where the deposition gas is introduced into the process chamber before said loading, to pre-coat a film on inner sidewalls of the process chamber.

21. Niino shows a method of cleaning a reaction tube where the tube is pre-lined and cleaned between each successive etching process performed in the chamber (abstract).

22. It would have been obvious to one of ordinary skill in the art at the time of invention to use the pre-coating process of Niino in the processing system of Aitani in view of Takeda because pre-coating allows the chamber to be cleaned in a quicker fashion which produces a faster product pass-through (Columns 1 and 2 of Niino).

23. Regarding claim 11, this has clearly been shown above relation to claims 2 and 3 and is rejection using the same rejection there if the antecedent basis problems were removed.

24. Regarding claim 13, Niino shows wherein after said cleaning, the deposition gas is supplied into the process chamber before said loading, so as to pre-coat a film on inner sidewalls of the process chamber.

25. Regarding claim 14, Takeda shows wherein the connector is closed while the film is pre-coated on the inner sidewalls of the process chamber (clearly shown in Takeda above).

26. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al.

27. Applicants admitted prior art, specifically paragraph 9 which describes prior art figure 1, shows an apparatus for carrying out a chemical vapor deposition process comprising: a process

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chamber in which a chemical vapor deposition process is carried out; a cleaning gas supplier that supplies a cleaning gas; a plasma device that excites the cleaning gas supplied from the cleaning gas supplier; a deposition gas supplier that supplies a deposition gas to deposit a film on a wafer; a mixer that mixes gases supplied from the cleaning gas supplier and the deposition gas supplier, and that supplies the mixed gas to the process chamber.

28. Applicants prior art does not show a flow back preventer that prevents the deposition gas from flowing back toward the cleaning gas supplier.

29. As has been shown above, flow back prevention is well known in the art.

30. Takeda et al shows "two valves to prevent a film forming gas... and a cleaning gas... from reversly flowing into different passage from the specified one."

31. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the valve system of Takeda as a flow prevention mechanism of Applicants admitted prior art because it "prevents piling of ammonium chloride and so on which in generated by mixing forming gas and cleaning gas".

32. Regarding claim 16, Applicants prior art clearly shows wherein each of the cleaning gas supplier and the deposition gas supplier include gas supply parts that supply gas, a gas supply line for guiding the gas supplied from the gas supply parts, and switching valves installed between the gas supply parts and the gas supply line so as to control flow rate of the gas.

33. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of US Patent no. 5,063,783 to Zajac.



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34. Applicants prior art in view of Takeda does not show wherein the flow back preventer comprises: an inert gas supply part that supplies an inert gas; an inert gas supply line that guides the inert gas to a gas supply line of the cleaning gas supplier; and a switching valve installed between the inert gas supply part and the inert gas supply line to control a flow rate of the inert gas.

35. Zajac shows a pressure monitoring system for a semiconductor monitoring device where an inert gas supply source supplies gas to a supply line with a switching valve to control the rate of flow of the inert gas ("Flow Restrictors" – Col 2, lines 28-39 – Figure 1).

36. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the inert gas supply and switching device of Zajac as the inert gas supply in the system of Applicants prior art in view of Takeda as shown above because the use of a backflow system prevents the backflow from corrosive gases in the chamber (Col 1 lines 37-49 of Zajac).

37. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of US Patent no. 6,068,703 to Chen et al.

38. Applicants prior art in view of Takeda does not show wherein the flow back preventer comprises a switching valve installed between the cleaning gas supplier and the mixer.

39. Chen et al shows a gas mixing device where valves are clearly placed between the gas sources and the mixer in order to control the flow of gas from the gas source into the mixer.

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40. It would have been obvious to use the flow prevention valves of Chen as the switching valve of Applicants prior art in view of Takeda because the use of a valve would prevent the cleaning gas from entering the mixer at an unwanted time.

41. Referring to claim 19, wherein the switching valve is automatically closed when the deposition gas is supplied to the process chamber by the deposition gas supplier. Examiner notes that this would be obvious to one of ordinary skill in the art and is clearly the point of the valves as shown in rejection of claim 19 as well as previous rejections.

42. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art in view of Japanese Patent Abstract of Publication Number 1997-246260 A to Takeda et al and further in view of U.S. Patent No. 5,902,403 to Aitani.

43. Applicants prior art does not specifically mention where the cleaning gas is a fluorine radical. Aitani clearly shows the use of a fluorine radical as applied to claim 5 above.

44. It would have been obvious to one of ordinary skill in the art at the time of invention to use the fluorine gas of Aitani as the cleaning gas of the current invention because it is well known as a cleaning gas.

### ***Conclusion***

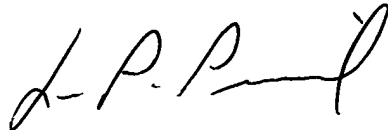
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael D Masinick whose telephone number is (703) 305-7738. The examiner can normally be reached on Mon-Fri, 7:30-4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (703) 308-0538. The fax phone number for the organization where this application or proceeding is assigned is (703) 746-7239.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

mdm

A handwritten signature in black ink, appearing to read "L. Picard", with a stylized flourish at the end.

LEO PICARD  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100